



The Aeronautical Newsletter of the  
**Seattle Flight Standards District Office**

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## **PRACTICAL DENSITY ALTITUDE, PART I**

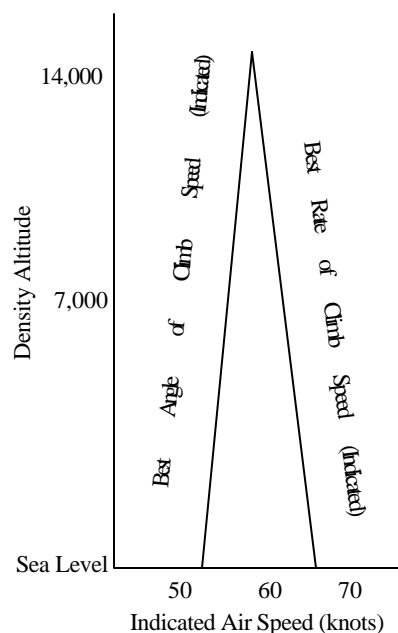
Recently, I had the pleasure of sitting in on a seminar on Density Altitude taught by National Transportation Safety Board accident investigator Kurt Anderson. It was the most insightful, most inspirational seminar I have attended in 20 years. Mr. Anderson has interviewed many pilots who have survived airplane accidents and has gained incredible insight about what they were thinking just before they crashed.

During his NTSB career, Kurt has investigated over 400 airplane accidents. His area of responsibility is the 5 northwest states. He is the owner of a light, single engine airplane, and a Flight Instructor. Mr. Anderson has identified nine Deadly Sins which are commonly involved in Density Altitude accidents. Nine things pilots either learned and then forgot, or didn't learn at all, or learned wrong, which are contributing to the accidents. We will cover at least one of these Deadly Sins in each issue of AeroSafe until we cover them all..

Deadly Sin Number One. When climbing out from an airport at

which Density Altitude is a concern, **DO NOT CLIMB AT THE SAME INDICATED AIRSPEED YOU WOULD USE AT A SEA LEVEL AIRPORT!**

Assume you are flying a non-turbo charged, piston driven airplane. At sea level, the indicated best rate of climb speed is a higher number than the indicated best angle of climb speed. As density altitude increases, the indicated best rate of climb speed decreases, and the indicated best angle of climb speed increases. The amount of change between sea level and a density altitude of 8,000 feet is typically 5 to 8 knots of decrease in indicated best rate of climb speed, and 4 to 7 knots of increase in indicated best angle of climb speed. At some



point best indicated rate of climb speed and best indicated angle of climb speed merge and become the same number. When this happens the airplane has reached its' Absolute Ceiling.

The misconception which is leading many of our pilots to disaster is attempting to climb out of airports where density altitude is a concern at the same indicated airspeed they use to climb out of sea level airports. If you are flying a non-turbo charged piston driven airplane, don't do it!!! You loose performance either way.

Assume you are trying to climb over an obstruction at the departure end of the runway from an airport with an 8,000 foot density altitude. Your indicated best angle of climb speed is likely to be 4 to 7 knots faster than indicated best angle of climb speed at sea level (check your Pilot Operating Handbook). If you mistakenly attempt to climb at your sea level indicated best angle of climb speed, you are probably 4 to 7 knots too slow. You have taken an airplane whose climb performance is poor at best and made it downright lousy! There is a real good chance the airplane will not climb at all and will simply mush into the obstacle.

Next, assume you are departing from an airport with an 8,000 foot density altitude in the same non-turbo charged, piston driven airplane. The challenge this time is to climb over the ridge which is 4 miles away. Your indicated best rate of climb speed is probably 5 to 8 knots lower than your indicated best rate of climb speed at sea level (Check your Pilot Operating Handbook). If you mistakenly attempt to climb at your sea level indicated best rate of climb speed, you are probably 5 to 8 knots too fast. Some pilots even add a few knots, "just to be on the safe side". You have taken an airplane whose climb performance is poor at best and made it downright lousy! There is a real good chance the airplane will get itself out of ground effect and then refuse to climb at that indicated airspeed and simply mush into the ridge. This is a big factor in our Density Altitude accidents.

Our guess is that since it is proper to use the same indicated airspeed, **while approaching to land**, regardless of the Density Altitude, quite a number of pilots have come to the mistaken conclusion that the same is true during takeoff. **NOT SO!!!**

Airplanes with turbo charged, piston driven engines must also use indicated best rate of climb speeds which are lower than sea level indicated best rate of climb speeds, but only above altitudes where the turbo charger begins to lose efficiency.

Most all of the density altitude accidents within the five northwest states involve situations requiring climbs at best rate of climb speed. Seldom do they involve climbs at

best angle of climb speed. But either way, using sea level indicated climb speeds in high density altitude situations, has the ability to transform poor climb performance into zero or even negative climb performance.

Thanks Kurt.

### **RUNWAY INCURSIONS**

The FAA Administrator has assured Congress that we will reduce Runway Incursions in the future. From time to time, some light is shed about just how some of these happen. We at AeroSafe will forward the information to you as we become aware of it. Here's one:

Assume airplane "B" requests taxi instructions from Ground Control, and is instructed to "Taxi to runway 36". Airplane "B" taxis to an intersection along runway 36 which is not the full length point, but does not inform either the Ground Controller or the Tower Controller of the desire to make an intersection takeoff. At the full length point of runway 36 is airplane "C" which just happens to be the same make and model as airplane "B". Ready for takeoff and holding on the runway is airplane "A". Airplane "B" reports, "Ready for takeoff," at or near the same time airplane "A" has been cleared to takeoff. Confusing airplane "C" (full length) with airplane "B" (intersection), the Tower controller clears airplane "B" to taxi into position and hold. If airplane "B" taxis onto the runway in front of airplane "A", we have a runway incursion at best, and an awful disaster at worst.

Why did the Tower controller "assume" airplane "B" was holding short at the full length position? Because the Aeronautical Information Manual, paragraph 4-3-10 (b) states, "An aircraft is expected to taxi to (but not onto) the end of the assigned runway unless prior approval for an intersection departure is received from Ground Control." Paragraph 4-3-10(c) goes on to add, "Pilots should state their position on the airport when calling the tower for takeoff from a runway intersection."

If you have Runway Incursion information you think would be of interest to other pilots, please send it along.

### **OREGON AIR FAIRE**

The Oregon Air Fair is scheduled for Saturday and Sunday, Sept. 16<sup>th</sup> & 17<sup>th</sup> at the Linn County Fair and Expo adjacent to the Albany Airport (S12). Take I-5 North or South to the Knox Butte/Expo Center exit, or fly into the Albany airport. Expo Center is next to I-5 and the airport.

Hangar Theater speakers including Aeronautical Humorist Rod Machado, Tuskegee Airman Bill Holloman, Aviation Adventurers John and Joyce Proctor, and FAA-NASA's Peter McHugh.

Saturday will feature a Flying Companion Seminar (contact Betty Larson, 503-255-0418 to register). Enjoy youth activities, aviation exhibits, pilot and maintenance training, an IA renewal course, aircraft displays, and more. Maintenance training is 7AM to

6PM Saturday, exhibits open 8AM to 5 PM. Fly in, bring the family.

For further information contact Gordon Read or Keith Crimin from the Hillsborough FSDO at 1-800-847-3806 – extension 5512.

## **WHAT'S IN A LOW PASS? TROUBLE**

**by Dennis Franks**

Until a few weeks ago, I believed what I think a lot of pilots believe. That is, a low pass along a runway is not in itself a violation of the FAR's. I mean, after all, you do have to land that bird somewhere and that's going to require a descent down close to the surface. So it would seem that making a low pass over an airport runway would not be outside the realm of things one expects to see at an airport: an aircraft at low altitude. Well, unfortunately, a low pass done by itself is in fact a violation of the minimum safe altitude tenets of FAR 91.119.

Right here I want to define exactly what I mean by a "low pass". It's a maneuver in which the pilot flies as if approaching to land, descending below Minimum Safe Altitude, but stays above the runway, in effect doing a low level fly-by, generally at high speed, with no intention of landing.

FAR 91.119 starts with the words, "Except *when necessary* for takeoff or landing...." In terms of a low pass being a violation, I can guess that if one's goal was to increase the level of safety in operations at airports, one thing which would be seen as a non-essential would be someone buzzing down the runway at 20 to

50 feet up and at high speed. While that seems obviously inappropriate, I asked myself, "How is a low pass as a result of a missed approach or a go-around distinct from simply flying down the centerline?"

Consider the phrase "when necessary for takeoff or landing". A low pass simply for the purpose of experiencing flying close to the surface or to display an aircraft in flight at close range, is by definition, not for the purpose of taking off or landing. It can be done in conjunction with an air show or testing of a repair or alteration which would require a low pass. Even then, a waiver specifying the who, what, why, where, and when would still be required. The key phrase is "necessary for takeoff or landing". There are appropriate landing activities conducted over airports during which it is necessary for the aircraft to be operated below Minimum Safe Altitudes. The obvious examples are: an IFR missed approach procedure; training for a go-around maneuver; proficiency in the go-around maneuver; recovery from a botched landing approach; and an actual go-around. What we see here is that being low over a runway is considered appropriate when it is associated with, or is the result of, another appropriate activity involved with taking off or landing an aircraft. Another feature of these activities is that there is either an actual intent to land or a real potential or possibility of landing. You may wonder how someone can show what the "intent" of someone else is. Well, in the case of a low pass, if the aircraft is too high or too fast to land on the available runway, or if

the landing gear are not lowered, it is clear that the pilot had no intention of landing.

There is a long history of NTSB decisions (case law) supporting this. Incidentally, it does not matter if the Air Traffic Control Tower gave a clearance for the maneuver. Control Towers are concerned about aircraft separation and not about enforcement of FAR 91.119. In the end, doing a fly-by low over an airport is just not an appropriate thing to do, and it does unnecessarily create an undue hazard. So, if you are **not** coming in to land, or engaged in an appropriate landing activity, be aware that the minimum safe altitude rules of FAR part 91.119 apply.

## **STUDENT PILOT ALERT**

When Student Pilots successfully pass their flight physical exam, the Medical Examiner issues a document which is a combination Student Pilot Certificate and Medical Certificate. Even though it comes on one piece of paper, the FAA considers it to be two documents. Here comes the caution. Your Student Pilot Certificate is valid for two years, but if you are less than 40 years old at the time of your flight physical exam your third class medical is valid for three years. This means on one piece of paper, you could have two documents which expire at two different times. It can be very confusing. We have found several Student Pilots soloing with current medical certificates but with expired Student Pilots Certificates!

The FAA can see what a problem this can be and we are planning to fix the situation sometime in the future. We will be sure to tell you when it happens and what it entails. In the meantime, treat your Student Pilot Certificate as if were two documents ('cause it is) and watch the expiration dates.

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### **AEROSAGE**

The Ten Commandments contain 297 words. The Bill of Rights is stated in 463 words. Lincoln's Gettysburg Address contains 266 words. A recent federal directive to regulate the price of cabbage contains 26,911 words.

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#### **ADDRESS CHANGE?**

The address list is stored in a computer in Oklahoma City. They are the ones to notify of any address changes so we can continue to bring you AeroSafe and other good stuff.

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Branch  
Box 25082  
Oklahoma City, OK 73125

# AEROSAFE

May you always find VFR and tailwinds



A Bearly Able Publication